

**REMARKS**

Claims 1 to 4, 6 to 21, and 23 to 30 are pending in the application. By this amendment claims 5 and 22 have been canceled and new claims 29 and 30 have been added. Independent claim 1 has been amended to incorporate the limitations of canceled claim 5 and, additionally, incorporate limitations generic to the limitations of claims 17 and 18. Independent claim 12 has been amended, similar to claim 1, to incorporate the limitations of canceled claim 22 and, additionally, incorporate limitations generic to the limitations of claims 17 and 18. New claim 29, dependent on claim 1, has been added as a method having similar scope to claim 17, and new claim 30, also dependent on claim 1, has been added as a method having similar scope to claim 18. Other, dependent claims have been amended to reflect amendments made to the independent claims on which they are dependent.

The claimed invention is introduced by a description of the prior art with reference to Figures 24, 25 and 26. Figure 24 shows the basic arrangement of a PON (Passive Optical Network) system. Figures 24 and 25 show dual arrangements designed to ensure the reliability of a PON system. As clearly set forth in the specification, this prior art has certain disadvantages which the disclosed and claimed invention solve. Specifically, in each of the dual arrangements of the conventional PON systems shown in Figures 25 and 26, even if a fault occurs in only the transmission/reception 103-1a of the 0-system ONU (Optical Network Unit) 107-1, which is part of the PON system, the overall PON system must be simultaneously switched from the 0-system to the 1-system in order to restore a path under communication. That is, switching is performed even for the ONUs 107-2 to 107-n that are operating normally. As a result, the communication quality deteriorates due to short breaks and the like caused in this operation. This is because in each of the arrangements of the conventional PON systems shown in Figures 25 and 26, the active and standby systems are physically discriminated from each other, and the standby system cannot be used until it is

selected by the selector (SEL) 105. In addition, the active system is switched to the standby system by only interchanging the physical transmission paths, and only the same connection as the preceding connection is restored.

The claimed invention provides a protection switching method and apparatus for a PON system, which can easily switch only a path to be restored to a standby-system path without affecting communication through normal virtual paths in the PON system. In the claimed method, when a communication abnormality in at least one active-system virtual path established between the optical line terminal and the subscriber terminal through the transmission path and the network unit is detected, only the switch to switch the transmission paths to establish a standby-system virtual path between that optical line terminal and the subscriber terminal serving as a communication partner is switched, without affecting communication through normal virtual paths in the PON system. This is illustrated for the example of an ATM (Asynchronous Transfer Mode) system in Figures 6 and 7. As shown in Figures 6 and 7, the switch (SW) 4 outputs an ATM cell to one of a plurality of ports, to which the active-system (illustrated here as the 0-system) and the standby-system (illustrated here as the 1-system) sections are connected, in accordance with a header value added to the ATM cell. When there is a communication abnormality, as shown by the X in Figure 6, the ATM cells are intended for subscriber terminal 91 now are re-directed through the 1-system transmission/reception section, as shown in Figure 7.

Claims 1 to 4, 10, 12, 15, 16, 19 to 21, 27, and 28 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Admitted Prior Art (Figs. 24–26, pages 1–9) in view of U.S. Patent No. 6,433,900 to Kuroyanagi et al., newly cited in the Office Action mailed February 25, 2004. This rejection is respectfully traversed for the reason that the combination of the Admitted Prior Art and the newly cited reference to Kuroyanagi et al. do not fairly suggest the claimed invention as required by MPEP 2141. It is noted that while omitted from the statement of the rejection, the Examiner considers claims 13 and 14 in the body of the rejection, so it is understood that these two claims are included in this first

ground of rejection. Further, it is noted that the independent claims in this application now contain limitations of canceled claims 5 and 22 and limitations generic to the limitations of claims 17 and 18. These claims, however, were subject to the following rejections: Claims 5 to 9, 11 and 22 to 26 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Admitted Prior Art in view of the patent to Kuroyanagi et al., further in view of U.S. Patent No. 5,838,924 to Anderson et al., and claims 17 and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Admitted Prior Art in view of the patent to Kuroyanagi et al., further in view of U.S. Patent No. 5,455,701 to Eng et al. Therefore, for purposes of this response, it is assumed that the claims now in the case would necessarily have to be considered under 35 U.S.C. §103(a) on the combination of (1) the Admitted Prior Art, (2) the newly cited reference to Kuroyanagi et al., (3) the patent to Anderson et al., and (4) the patent to Eng et al. It is respectfully submitted that such a combination does not make obvious the claimed invention.

Kuroyanagi et al. disclose a protection switch comprising a demultiplexer, optical selector, a multiplexer, and a monitor circuit is provided on the input side and the output side of an optical XC node. The demultiplexer demultiplexes the wavelength-multiplexed optical signals of a 0-system and a 1-system, and transmits these optical signals to the optical selectors which are provided for the respective wavelengths. The optical selectors are controlled by the monitor circuit, and switch the optical signal of one system to that of the other system when a fault occurs. The optical signals of the respective wavelengths outputted from the optical selectors are multiplexed by a multiplexer to be transmitted. The demultiplexer and the multiplexer can be differently arranged depending on the configuration of a transmission line or the optical XC node. Further, a multi-wavelength selection filter such as an acousto-optical filter or the like can be used as a protection switch.

First of all, it will be understood that the optical communication system disclosed by Kuroyanagi et al. is fundamentally different from the communication

system in which the disclosed and claimed invention is used. The Kuroyanagi et al. communication system is a wavelength (i.e., frequency) multiplexed communication system, whereas the communication system in which the disclosed and claimed invention is implemented is a packet switched communication system, either synchronous or asynchronous. These are fundamentally different communication systems requiring different structure and operation.

Independent claim 1, as amended recites “outputting by said switch a data cell to one of a plurality of ports, to which said first active-system transmission/reception section and said first standby-system transmission/reception section are connected, in accordance with one of a header value added to the data cell or a time slot of a frame”. New dependent claim 29 recites that the step of transmitting “transmits an ATM (Asynchronous Transmission Mode) cell to one of a plurality of ports, to which said first active-system transmission/reception section and said first standby-system transmission/reception section are connected, in accordance with a header added to the ATM cell”, while new dependent claim 30 recites that the step of transmitting “transmits a data cell to one of a plurality of ports, to which said first active-system transmission/reception section and said first standby-system transmission/reception section are connected, in a synchronous transfer mode in accordance with a time slot of a frame”.

The Examiner relies on the patent to Eng et al. to show an asynchronous transfer mode packet switching system. Eng et al. does not teach a “protection switching method for a passive optical network (PON) system” as specifically recited in independent claim 1 or a “protection switching apparatus for a passive optical network (PON) system” as specifically recited in claim 12, and even if the teachings of Eng et al. could be combined with the Admitted Prior Art and the patent to Kuroyanagi et al., it would not result in the claimed invention.

The Examiner relies on the patent to Anderson to provide a teaching that a protection channel bandwidth is not reserved and may be shared by several working connections. This “teaching” by Anderson et al. does not suggest “setting

an active-system virtual path and a standby-system virtual path between said optical line terminal and said subscriber terminal in *different* bands" (emphasis added) as recited in independent claims 1 and 12, as amended.

The Examiner is reminded of the basic considerations which apply to obviousness rejections as set out in MPEP 2141. Specifically, "When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

- “(A) The claimed invention must be considered as a whole;
- “(B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
- “(C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and
- “(D) Reasonable expectation of success is the standard with which obviousness is determined.”

Basically, the Examiner is attempting to reconstruct Applicant's claimed invention based on the hindsight of Applicant's own disclosure.

In view of the foregoing, it is respectfully requested that the application be reconsidered, that claims 1 to 4, 6 to 21, and 23 to 30 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



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